

## Stormwater Monitoring Quality Assurance Project Plan Template

### 1.0 Background and Scope

In Maine, there are 30 municipalities (permittees) regulated by the 2022 Maine General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4 General Permit). The MS4 General Permit requires that the municipalities conduct dry weather inspections on 100% of their outfalls during the 5-year term of the MS4 General Permit.

Under most conditions, if an outfall is observed to have dry weather flow, monitoring must be conducted to assess whether or not there is an illicit discharge associated with the flow. (Part IV(C)(3)(e)(vi) of the MS4 General Permit contains a few conditions under which flowing outfalls do not need to be monitored.)

The following monitoring needs to be conducted whether the outfall's dry weather flow exhibits evidence of an illicit discharge or not:

- E. coli, enterococci, total fecal coliform or human bacteroides;
- Ammonia, total residual chlorine, temperature, and conductivity; and
- Optical enhancers or surfactants.

The objective of the monitoring is to collect data that can be used to determine if there is an illicit discharge present in the flow, or if the flow is from uncontaminated groundwater, water from a natural resource, or an allowable non-stormwater discharge.

The purpose of this Quality Assurance Project Plan (QAPP) is to provide sampling personnel information that will assist them in collecting samples and analyzing the samples using field equipment/test kit(s) and/or laboratories in a manner that ensures sufficient accuracy and precision so that sampling personnel and regulators can be confident there is or is not an illicit discharge present in dry weather flow from an outfall. This QAPP provides information on several field equipment/test kit(s) and analytical methods available to permittees that can be used to comply with the requirements for Dry Weather Outfall Monitoring.

**Illicit Discharge:** Any discharge to a regulated MS4 system that is not composed entirely of stormwater other than:

- Discharges authorized pursuant to another permit issued pursuant to 38 M.R.S. §413
- Uncontaminated groundwater
- Water from a natural resource (such as a wetland)
- Other Allowable Non-Stormwater Discharges identified in Part IV(C)(3)(h) of the MS4 General Permit.

Each municipality is required by the MS4 General Permit to prepare a written Illicit Discharge Detection and Elimination (IDDE) Plan. This QAPP has been developed to be an attachment to a municipality's IDDE Plan, and therefore does not contain all of the IDDE requirements associated with the MS4 General Permit. For example, some communities are conducting outfall inspections more frequently than once every 5 years. The IDDE Plan should be consulted to determine the municipality's frequency of inspections. In addition, if there is

evidence of an illicit discharge, the municipality must conduct additional investigations to identify the source and work with responsible parties to remove the source. The IDDE Plan describes the processes and procedures specific to a municipality for the subsequent investigations.

## 2.0 Sampling Procedures

Samples are required to be collected at outfalls that exhibit dry weather flow (defined as flow after there has been no precipitation greater than ¼ inch for 72 hours, and no melt water from snow or ice).

Personnel should be prepared to collect samples during any outfall inspection, because dry weather flow is sometimes intermittent, and if personnel need to return to the site later in the same day, or several days later, the dry weather flow may no longer be present.

**Table 1** contains a list of equipment that should be prepared and available in order to conduct dry weather monitoring.

Samples will be collected from a flowing source only (not from stagnant water), and where the pipe outlet has at least 1 or 2 inches of free-flowing drop before any standing water or pool below it. Stagnant water should not be sampled unless the municipality deems it necessary for some reason.



*This outfall, though in poor condition because it is cantilevered, provides a good opportunity for a clean catch of its discharge.*



*This outfall is partially submerged and a clean catch of its discharge is not possible. If tidal influences are strong, wait until low tide to sample. Additional options include: sampling upstream structures or using sand bags around the outfall to prevent contamination from backflow.*

Table 1 provides a list of equipment that should be gathered and available for use in the event dry weather outfall monitoring needs to be conducted.

1 Gallon of Distilled or de-ionized water for rinsing
1 Roll Paper towels
3-5 clean plastic 250 ml beakers for water sample collection in Baggie marked "Clean" or disposable "whirl bags"
Garbage bags
1 long sampling pole and or sampling pump and tubing
Equipment to remove and access catch basin covers if needed (pull, hammer, crowbar)
Field equipment/test kits (see Table 2) and bottles for any laboratory samples or off-site field test kits. Ensure field test kits reagents have not expired typically keep bottles for 3-5 samples available
Non-latex gloves
Box of 1 gallon plastic bags
Cooler with ice
Camera or phone
Safety Vest
Steel toed boots - waterproof
Scissors
Sunscreen and bug spray
Clip board
3-5 Field Data Sheets (See Addendum 1)
Chain of Custody (Addendum 3)
Sharpies and water-proof pens
Packing tape and Duct tape
Sheet of blank labels for bottles
First aid kit
Small white board with pen to mark outfall ID, date, and time in photo



### Table 1 Field Equipment for Monitoring

For each outfall sampled, a Field Data Sheet will be used to document the date, time, and location of sample(s) collected, weather conditions, any general observations related to the tests being performed, and results of any parameters analyzed using field equipment or test kits. Note that the Field Data Sheet has a place to document sample observations including odor, color, turbidity, presence of algae, etc. The observations can be documented in this location instead of, or in addition to, the observations made during the normal outfall inspection (which should be conducted in accordance with the MS4's IDDE Plan or SOP).

Sample bottles that will be taken away from the sampling site for analysis will be labelled with the date, time and sample location as well as the name of the sampler. Example labels are provided in Addendum 1 along with an example field data collection sheet.

When using a third-party laboratory for any off-site analysis, sample bottles should be obtained before the sampling event. Coordination with the laboratory is also recommended to ensure that sample hold times and preservation requirements are being met. If samples are being collected on a Friday, some laboratories need prior notice to meet short hold times. Analytical methods, hold times and other pertinent information is described in Section 3 of this QAPP.

After sampling events, any reusable sample collection containers will be cleaned with soap and water or trisodium phosphate and water. Cleaning will be completed in a location where wash water can be discharged to a licensed wastewater treatment plant, sanitary sewer, or septic system.

### 3.0 Analyses and Reporting limits

The MS4 General Permit does not require samples to be analyzed using Clean Water Act (CWA) Methods published in 40 Code of Federal Regulations Chapter 136. The use of field equipment/test kit(s) and laboratories are both allowed. The MS4 General Permit does not require samples to be analyzed by a laboratory that is certified by the Maine DEP. However, this QAPP specifies that when a commercial laboratory is used for a CWA method, it will be certified by the Maine DEP for the CWA method specified.

Use of a certified laboratory is specified in this QAPP because the data generated by a certified lab would be more likely to stand up in a court of law than data generated by a non-certified lab.

A list of commercial certified laboratories is available on the Maine DEP website at: <https://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml> .

**Note:** Many Wastewater Treatment Plants conduct bacteria analysis for operational purposes. If there is a Wastewater Treatment Plant in the area, it can also be used for the bacteria screening.

This QAPP does not specify CWA methods or Maine DEP certification for use of field equipment/test kit(s).

**Table 2** provides information related to sampling parameters, analysis methods, and sample preservation and holding times that may be used during dry weather outfall monitoring. Analysis methods specified in **Table 2** include CWA methods, field equipment, and test kits, where applicable. **Table 2** also provides information on when a given CWA Method, Field Equipment or Test Kit might be preferable if there are multiple options for a given parameter.

Prior to sampling, the sampler and Sustainability Coordinator will determine what analysis method (CWA Method, Field Equipment or Test Kit) will be used.

User manual(s) and safety data sheets (SDS) for field equipment and/or test kit(s) that will be utilized for dry weather monitoring are included as Addendum 4 to this QAPP, or may be kept in a separate electronic or paper location as long as they are easily accessible to the field personnel who will be conducting the monitoring.

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Bacteria - select one or more based on discharge environment	CWA Method, Field Equipment, or Test Kit	Preservation	Holding time	Bottle needed	Notes on Use
Bacteria - E. coli	SM 9223 B (IDEXX Collifert Quanti-Tray) EPA 1603 (membrane filtration, MF) Or SM 9221 B (Most probable number, MPN)	Ice	To lab w/i 6 hours Analyze w/i 2 hours of receipt	120 ml or 250 ml plastic sterile bottle with lid from lab	Use for discharges to freshwater (with ammonia and either optical enhancers or surfactants)
Bacteria - enterococcus	SM 9230 B, C or D, (MPN including IDEXX Enterolert, or MF) EPA 1600 (MF)	Ice	To lab w/i 6 hours Analyze w/i 2 hours of receipt	120 ml or 250 ml plastic sterile bottle with lid from lab	Use for discharges to salt water (with ammonia and either optical enhancers or surfactants)
Bacteria – Fecal Coliform	SM 9222 D (MF CFU/100ml) Or SM 9221 C, E (Multitube MPN/100ml)	Ice	To lab w/i 6 hours Analyze w/i 2 hours of receipt	120 ml or 250 ml plastic sterile bottle with lid from lab	Use for discharges to salt or freshwater (with ammonia and either optical enhancers or surfactants)
Bacteria – Human Bacteroides	Labs: EMSL (NJ), Microbial Insights (TN) or Source Molecular (FL) Or Dr. Steve Jones, UNH	Ice	To lab w/i 24 hours Analyze w/i 48 hours	1000 ml plastic bottle with sodium thiosulfate from lab (with insulated shipping box)	Use for discharges to salt or freshwater (with ammonia and either optical enhancers or surfactants).  Not a CWA method, so Maine Laboratory certification not required.

Ammonia (select one method)	CWA Method, Field Equipment, or Test Kit	Preservation	Holding time	Bottle needed	Notes on Use
Ammonia	Hach Ammonia Test Strips	None	Immediate (w/in 15 min) in Field	Field jar or beaker	
Ammonia	Laboratory Method EPA 350.1/350.2	H <sub>2</sub> SO <sub>4</sub> (pH <2) + Ice	28 days	250 ml plastic bottle from lab	
Ammonia	Hach DR300 Pocket Colorimeter Ammonia Nitrogen or LaMotte 3680-01 DC1200 Colorimeter test kit	None	Immediate (w/in 15 min) in Field	Field jar or beaker	Reagent contains Mercury, Generates a Toxic Hazardous Waste (D009)  instructional video (10 minutes): <a href="https://www.youtube.com/watch?v=hFiEEEAwmWf0">https://www.youtube.com/watch?v=hFiEEEAwmWf0</a>
Total Residual Chlorine (select one method)	CWA Method, Field Equipment, or Test Kit	Preservation	Holding time	Bottle needed	Notes on Use
Chlorine	Field kit -- Hach Colorimeter II low range	None	Immediate (w/in 15 min) in Field	Field jar or beaker	Instructional video available at: <a href="https://www.youtube.com/watch?v=WTTUD0Hg1Vw">https://www.youtube.com/watch?v=WTTUD0Hg1Vw</a>
Chlorine	Industrial test Systems Ultra-Low Total Chlorine Test Strips and other mid range chlorine test strips	None	Immediate (w/in 15 min) in Field	Field jar or beaker	As of 6/2020, USEPA had not used Ultra low chlorine test strips (0.2 to 0.5 mg/L). Informal review shows these should be used simultaneously with a mid range (0.5 to 10 mg/l) test strips to double check range.
Temperature and Conductivity (use both)	CWA Method, Field Equipment, or Test Kit	Preservation	Holding time	Bottle needed	Notes on Use
Temperature	Temperature/ Conductivity probe	None	Immediate (w/in 15 min) in Field	Field jar or beaker	Use to distinguish between groundwater and surface water.
Conductivity	Temperature/ Conductivity probe	None	Immediate (w/in 15 min) in Field	Field jar or beaker	Use to distinguish between salt water and fresh water.



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Optical Enhancers or Surfactants (select one)	CWA Method, Field Equipment, or Test Kit	Preservation	Holding time	Bottle needed	Notes on Use
Surfactants	SM5540C	Ice	To lab w/i 24 hours, analyze w/i 48 hours	500 ml plastic bottle from lab	Works on most soaps (laundry detergent, personal care products, dish soap)
Surfactants	CheMetrics K-9400 field test kit (see Maine DEP guidance on handling and disposal in <b>Addendum 2</b> )	None	Immediate (w/in 15 min) in Field	Field jar or beaker	Works on most soaps (laundry detergent, personal care products, dish soap). Contains alcohol and chloroform. Generates a Flammable (D001) and Toxic (D022) Hazardous Waste. Do not use test kit in the field unless licensed to transport hazardous wastes. Instructional Video available at: <a href="https://www.youtube.com/watch?v=6vwiZgWqa04">https://www.youtube.com/watch?v=6vwiZgWqa04</a>
Optical brighteners	VWR handheld UV lamp: UV-A: 360-365 nm, model number 89131-488	None	Analyze w/i 7 days	Unbleached cotton pad wetted w/ sample placed in sealed baggie	Works only on water with high to moderate laundry detergent. Provides only presence/absence.
Optical brighteners	Maine Healthy Beaches Fluorometer (\$15,000 unit)	None	Keep in a dark container, provide to MHB in 1-2 days, analyze w/i 7 days	Whirl bag or 100 ml plastic bottle.	Provides semi-quantitative numeric fluorescence of sample. Need to provide sample to MHB in bottle or whirl bag (in a box or cooler). One week hold time. Provide advanced notice to coordinate delivery to office. Organic matter, tannins or color will interfere.
Other Optional Parameters	CWA Method, Field Equipment, or Test Kit	Preservation	Holding time	Bottle needed	Notes on Use
Dissolved Oxygen	Hach DO Test kit Model OX-2P	None	Immediate (w/in 15 min) in Field	Field jar or beaker	Waters of the state have Dissolved Oxygen standards. This test can show whether outfall contributions are affecting Dissolved Oxygen content of receiving waters.
Total Phosphorus	EPA 365.3	Sulfuric Acid (pH <2) + Ice (4°C)	28 days	250 ml glass bottle from lab.	Provides data regarding nutrient contributions to receiving waters which can originate from paved surfaces, fertilizers and eroding soils.



Other Optional Parameters (continued)	CWA Method, Field Equipment, or Test Kit	Preservation	Holding time	Bottle needed	Notes on Use
Personal Care Products	EPA 1694	Sulfuric Acid (pH <2) + Ice (4°C)	7 day to extraction 40 days after extraction	1000 ml amber jar	EPA Lab Chelmsford can run if capacity. Contact Todd Borci. Otherwise need to use a commercial laboratory.  EPA recommends analyzing only for following subset: Caffeine, 1,7-DMX (metabolite of caffeine), Acetaminophen, Carbamazepine (anti-depressant), Primidone (anti-epilepsy drug), Atenolol (high Blood pressure med), Cotinine (metabolite of nicotine), urobilin (by product of hemoglobin breakdowns), Azithromycin (antibiotic)
Total Suspended Solids	EPA 160.2 or SM2549D	Ice	7 days	1000 ml plastic bottle from lab	Provides general water quality information.
Biochemical Oxygen Demand	EPA 405.1 or SM5210B	Ice	To lab w/i 24 hours, analyze w/i 48 hours		
Total Petroleum Hydrocarbons DRO and GRO	SW 8015C	Ice	7 Days to extraction 40 days after extraction	500 ml amber glass jar and 3 40 ml VOA containers from lab w/ sulfuric acid	DRO is Diesel Range Organics (C10 to C28) GRO is Gasoline Range Organics (C5 to C10)
Nitrate + Nitrite	SM 4500 or EPA 300	Sulfuric Acid (pH <2) + Ice (4°C)	28 days	125 ml plastic bottle from lab	Provides data regarding nutrient contributions to receiving waters which can originate from paved surfaces, fertilizers, eroding soils or wastewaters.
Total Kjeldahl Nitrogen	SM 4500 or EPA 300	Sulfuric Acid (pH <2) + Ice (4°C)	28 days	1000 ml amber glass bottle from lab	Provides data regarding nutrient contributions to receiving waters which can originate from paved surfaces, fertilizers, eroding soils or wastewaters.

#### 4.0 Quality Control

The following are the reporting limits required by the MS4 General Permit:

- Ammonia: 0.5 mg/L
- Surfactants: 0.25 mg/L
- Total Residual Chlorine: 0.05 mg/L
- E. coli bacteria 4 cfu/100 ml
- Enterococcus 10 cfu/100 ml

To ensure the data collected meets the required reporting limits, the MS4 permittee will use either a Maine Certified Laboratory or one of the field equipment/test kit methods listed in **Table 2** to assess dry weather flow.

Each of the test kits listed in **Table 2** has a use range that is appropriate for the work being conducted and which meets the MS4 required reporting limits.

Test kit reagents that have expired will not be used. Test kit and temperature/conductivity probes that have useful life limits will be replaced when they have reached the end of their useful lives.

Maine Certified Laboratories have standard reporting limits for the parameters that conform to the MS4 General Permit required reporting limits.

**4.1 Duplicate Samples** To assess the precision of the dry weather flow monitoring, the municipality will collect one duplicate sample for every 10 samples collected. Precision reflects the reproducibility of a given parameter by calculating the Relative Percent Difference (RPD) of the samples. RPD is calculated as follows:

$$RPD = \frac{(X_1 - X_2) \times 100}{(X_1 + X_2) \div 2}$$

Where  $X_1$  is the concentration of one sample and  $X_2$  is the concentration of the duplicate sample.

Table 3 provides information on the use of duplicate samples and troubleshooting information in the event the duplicate samples results are outside acceptable precision limits. The Precision and Target Relative Percent Differences shown were taken primarily from the Draft USEPA Bacteria Source Tracking Protocol. It is not possible to cover all possible reasons a set of duplicate samples may be outside the precision or Relative Percent Difference targets, but the last column of the table lists a few considerations. If RPDs are not met on a day when samples were collected from multiple sites, the sampler should consider carefully the conditions that may have led to the issue and whether those conditions would cause all the sample results to be unreliable.

Table 3 Sample Precision Goals

Parameter	Precision/ Target Relative Percent Difference	Use of Data when it meets the Precision or RPD	Comments/Troubleshooting if outside Precision or RPD
Temperature	0.1 °C or 0.2 °F	Retain both sets of data.	Because there are no thresholds for additional investigations for this parameter, just retain both sets of data and provide any comments that may have affected discrepancy such as age and condition of meter, or if exposure to ambient temperature could have affected temperature of sample.
Specific Conductance	5 uS/cm	Retain both sets of data.	Because there are no thresholds for additional investigations for this parameter, just retain both sets of data and provide any comments that may have affected discrepancy such as age and condition of meter.
Bacteria (E-Coli, Enterococci, or Fecal Coliform)	+/- 100 col/100ml or 30% RPD	Retain both sets of data, use an average of the samples to compare to the investigation thresholds.	Assess cleanliness of equipment used to collect sample. Review Laboratory quality control reports for any errors or issues. Review visual observations of sample collected to assess if there were any differences in color, clarity, odor, or volume of discharge that could account for discrepancy. Consider resampling site.
Dissolved Oxygen	0.02 mg/L	Retain both sets of data.	Assess cleanliness of equipment used to collect sample. Consider resampling site.
All other parameters	30% RPD	Retain both sets of data, use an average of the samples to compare to any investigation thresholds.	Assess cleanliness of equipment used to collect sample. Consider resampling site.

**4.2 Equipment or Rinsate Blanks** For most instances, dedicated equipment and containers are used to collect samples, so that equipment and rinsate blanks are not required to be collected and analyzed. However, if equipment or collection containers are being used multiple times in the field for different sample locations, they should be cleaned in between samples, wash water should be collected in the field and disposed of when returning to office or lab spaces, and equipment or rinsate blanks should be collected and assessed. The USEPA Volunteer Monitor's Guide to Quality Assurance Project Plans has additional information on how to complete these tasks (EPA Document 841-B-96-003).

## **5.0 Field Data Sheets and Chain of Custody**

As described in Sampling Procedures, Field Data Sheets will be used to document sample collection. Field Data sheets will document the type of field equipment or test kit(s) used and results of any in-situ analysis. Example Field Data Sheets are provided in Addendum 1 to this QAPP.

Whenever samples will be sent to a laboratory for analysis, a Chain of Custody will be used to document sample collection dates, times, analytical methods requested, and custody of the sample from the time it was collected, until the time it was analyzed. Example Chains of Custody are provided in **Addendum 3** to this QAPP.

## **6.0 Data Reports**

Field data collection sheets shall constitute data reports for analyses using field equipment or test kits.

Whenever samples are sent to a laboratory for analysis, data reports are provided by the laboratory showing the sample location, date and time of collection, results of the analysis, the reporting limit, the person who conducted the analysis, the analytical method used.

## **7.0 Data Review and Follow up**

Once all data has been received, it will be reviewed by a Sustainability Coordinator. Data shall also be stored electronically or in paper format for at least 3 years following the expiration date of the MS4 General Permit, as required by the MS4 General Permit.

If the person collecting the sample is the Sustainability Coordinator, they may opt to have another municipal staff person review the data, or a Stormwater Manager or Coordinator from another municipality if they deem it necessary to assist in the overall investigation. Data should be reviewed within 2 weeks of receipt and additional investigations should be implemented to identify the source of any potential illicit discharge if any of the thresholds in **Table 4** are exceeded.



Table 4 Thresholds for Additional Investigation

Parameter	Threshold Level for Additional Investigation	Notes/Discussion
E. coli	236 cfu/100 ml – discharges into freshwater rivers or streams	All classifications of flowing fresh surface water in Maine (AA, A, B and C) have a standard that no more than 10% of the samples may exceed this concentration in any 90 day interval. A fresh surface water is at risk of impairment if it is receiving significant discharges from human sources above this concentration.
E. coli	194 cfu/100 ml – discharges into freshwater ponds	Great Ponds and lakes less than 10 acres have a standard that no more than 10% of the samples may exceed this concentration in any 90 day interval. A water of this type is at risk of impairment if it is receiving significant discharges from human sources above this concentration.
Enterococci	54 CFU/100 ml – discharges into saline/estuarine Class SA or SB	These waters have a standard that no more than 10% of the samples may exceed this concentration in any 90 day interval. A water is at risk of impairment if it is receiving significant discharges from human sources above this concentration. (Note Maine Healthy Beaches threshold is 104 MPN/100 ml)
Enterococci	94 CFU/100 ml – discharges into saline/estuarine Class SC	These waters have a standard that no more than 10% of the samples may exceed this concentration in any 90 day interval. A water is at risk of impairment if it is receiving significant discharges from human sources above this concentration. (Note Maine Healthy Beaches threshold is 104 MPN/100 ml)
Fecal Coliform	61 cfu/100 ml (2 times 31 cfu/100 ml for MF) to 100 cfu/100ml	The low end of this threshold is two times the 90 <sup>th</sup> percentile standards that DMR applies for approved (open) shellfish harvesting areas and is very conservative (90% of the samples collected from the area must be above these concentrations for the harvesting area to remain open and completely unrestricted for shellfish harvesting. See Addendum 2 for additional info from DMR)
Human Bacteroides	Any concentration may be indicative of human sewage, but MHB considers 4,200 col/100ml HB to be equivalent to the level of contamination that exceeds the EPA	Any concentration of human source of sewage should be investigated.

Parameter	Threshold Level for Additional Investigation	Notes/Discussion
	acceptable risk of gastrointestinal illness to swimmers. (Rothenburger and Jones, 2018 and Boehm, Soller and Shanks 2015)	
Ammonia	≥ 0.50 mg/L	This is the effective reporting limit of the Ammonia test strips and was taken from USEPA Draft 2012 Bacteria Source Tracking Protocol.
Chlorine	≥ 0.05 mg/L	Limit of test kit and was taken from USEPA Draft 2012 Bacteria Source Tracking Protocol.
Surfactants	≥ 0.25 mg/L	Taken from USEPA Draft 2012 Bacteria Source Tracking Protocol.
Optical Brighteners	≥ 100 ug/L) (≥ 0.10 mg/L)	This is used by Maine Healthy Beaches as an actionable threshold. If using a handheld fluorometer, conduct further investigation if presence of optical brighteners is detected

MS4s should use the thresholds listed above and the following general guidance to make determinations whether an outfall requires additional investigation for illicit discharges:

- Outfalls that have some visual evidence of an illicit discharge and exceed at least one of the above thresholds and should be investigated further using techniques described in the MS4s IDDE Plan.
- Outfalls that do not have any visual evidence of an illicit discharge but exceed more than one of the above thresholds should be investigated further using techniques described in the MS4s IDDE Plan

As described in Section 1 of this QAPP, if the above thresholds are not exceeded, the MS4 may make the determination that the flow is from uncontaminated groundwater, water from a natural resource, or an allowable non-stormwater discharge.

Revisions:

1. Original document prepared for 2022 MS4 General Permit Submission to Maine DEP

Addenda

1. Example Field Data Collection Sheet and labels
2. References:
  - a. E-mail on Surfactant field kit handling of residuals from DEP staff
  - b. E-mail on Fecal Coliform thresholds from DMR listed in Table 4
3. Example Chains of Custody
4. User Manual(s) and Safety Data Sheets (SDS) for Field Equipment and/or Test Kit(s) (This is an optional addendum. The information must be located where field personnel can access electronically or in paper form, so this Addendum can be used as a place to describe where field personnel will find equipment, manuals and SDSs).

References:

Rothenheber and Jones 2018. *Enterococci Concentrations in a Coastal Ecosystem are a function of fecal source input*. Published in Applied Environmental Microbiology, July 13, 2018.

Boehm, Soller and Shanks 2015. *Human-Associated Fecal Quantitative Polymerase Chain reaction Measurements and Simulated Risk of Gastrointestinal Illness in Recreational Waters Contaminated with Raw Sewage*. Published in Environmental Science and Technology Letters 2015, 2, 270-275.

## **Addendum 1**

### **Example Field Data Collection Sheet and labels**



**Addendum 1**  
**Example Field Data Collection Sheet and labels**

## Field Data Collection Sheet for Dry Weather Outfall Monitoring

Date _____	Project Name _____
Time _____	_____
Sampler's Name _____	Project Location _____
Weather: _____	
Sample Type: _____	
Sample Location/Sketch: _____	

### Field Parameters to Monitor

Parameter	Result (units)	Equipment Used	Threshold triggering additional investigation (see QAPP)
Temperature (all flows)	C/F		No threshold. FYI: Temp. is dependent on season. Groundwater is typically 40-55 F. Surface water can be hotter or colder.
Conductivity (all flows)	µS		No threshold. FYI: Groundwater is typ. Less than 1000 µS. Freshwater can be as high as 2000 µS. Saltwater can be as high as 55,000 µS.
Ammonia (potential bacteria sources)	mg/L	Hach Test Strips	≥ 0.50 mg/L
Surfactants or Optical Brighteners (potential bacteria sources)			Surfactants ≥ 0.25 mg/L Optical Brighteners ≥ 100 ug/L or if present
Chlorine (potential chlorine sources)	mg/l	Hach Colorimeter II low range	≥ 0.05 mg/L (test kit limit)

Observations (unless already documented as part of outfall inspection: odor, color, turbidity, algae, etc): \_\_\_\_\_

### Laboratory Analyses (see QAPP for thresholds)

Parameter	Method/ Lab Code	Comments
E. coli	SM 9223 B, EPA 1603, or SM 9221 B	For freshwaters
Enterococci	SM 9230 or EPA 1600	For marine/estuarine waters
Fecal Coliform	SM 9222 D or SM 9221 D, E	For fresh or marine/estuarine waters
Human Bacteriodes	qPCR	For fresh or marine/estuarine waters

### Comments/Field Notes


This set of labels was designed to be used with Avery 5366 labels, but you can use any labels.

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

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Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

Time: \_\_\_\_\_ Field ID: \_\_\_\_\_

**Addendum 2**  
**-Reference E-mails**



## Kristie Rabasca

---

**From:** Lewis, Bryant J <Bryant.J.Lewis@maine.gov>  
**Sent:** Thursday, October 31, 2019 4:46 PM  
**To:** Kristie Rabasca; Wahle, Benjamin  
**Subject:** RE: simple summary of Fecal concentrations for open vs seasonal vs restricted vs prohibited?

Kristie,

I did misunderstand the question. Unless there is a specific area of concern where we are collaborating on a special study with a town, we typically provide a yearly update for each station's geomean and P90 incorporating the most recent 30 sample scores. That annual trend is provided to towns so we are not usually contacting a town based on any one score to tell them that there might be a problem.

However- if trying to determine a trigger on a single sample, there is some subjectivity to the answer. I would suggest a value between 50-100 as a high value trigger. There is merit to your suggestion of using twice the 31 value as well since that is within that range. Often, our Scientists would use 100 as the high score value as their own flag to watch a station since an area that is already at risk of exceeding the approved standard based on the last 30 samples would likely go over a P90 of 31 with a 100 added. I think you would likely accomplish your goal by using any of the three values; 50, 62, or 100. I would recommend starting with 62 then re-evaluating after some data is built up to determine if that should be increased or decreased based on program needs.

Bryant Lewis  
ME Department of Marine Resources  
Growing Area West Program Supervisor  
194 McKown Point Road  
West Boothbay Harbor, ME 04575  
Tel: 207-633-9401  
Cell: 207-215-4107

---

**From:** Kristie Rabasca <krabasca@integratedenv.com>  
**Sent:** Thursday, October 31, 2019 2:42 PM  
**To:** Lewis, Bryant J <Bryant.J.Lewis@maine.gov>; Wahle, Benjamin <Benjamin.Wahle@maine.gov>  
**Subject:** RE: simple summary of Fecal concentrations for open vs seasonal vs restricted vs prohibited?

**EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

H Bryant,

I do a lot of illicit discharge investigations with and for the municipalities. Maybe I did not phrase my question properly.

---

For a single sample, at what concentration would DMR say to a municipality: "we think there might be a problem here". Is that concentration the 90<sup>th</sup> percentile number? 31? Or twice that?

---

Or do you wait until you see the GM or P90 number get close to its threshold for multiple samples?

Kristie L. Rabasca, P.E.  
207-415-5830 (cell)

**From:** Lewis, Bryant J <Bryant.J.Lewis@maine.gov>  
**Sent:** Thursday, October 31, 2019 2:33 PM

**To:** Kristie Rabasca <[krabasca@integratedenv.com](mailto:krabasca@integratedenv.com)>; Wahle, Benjamin <[Benjamin.Wahle@maine.gov](mailto:Benjamin.Wahle@maine.gov)>  
**Subject:** RE: simple summary of Fecal concentrations for open vs seasonal vs restricted vs prohibited?

Kristie,

I would suspect DEP and possibly the municipality should be contacted for possible illicit discharges.

We use DMR water quality stations to classify growing area waters. As part of our program, we also conduct surveys of the shoreline where we look for malfunctioning septic systems and other pollution sources and sample the mouths of streams entering growing area waters; however, we do not conduct investigations to determine the sources of contamination. Generally, it is up to the municipality to investigate degrading water quality while sometimes DEP can provide some additional assistance. If there is an area where water quality was degrading we would provide the municipality the information we have if they wished to investigate. The municipality would likely need to do additional work to locate the source of contamination but the information you are describing would likely be valuable in their effort.

Bryant Lewis  
ME Department of Marine Resources  
Growing Area West Program Supervisor  
194 McKown Point Road  
West Boothbay Harbor, ME 04575  
Tel: 207-633-9401  
Cell: 207-215-4107

**From:** Kristie Rabasca <[krabasca@integratedenv.com](mailto:krabasca@integratedenv.com)>  
**Sent:** Wednesday, October 30, 2019 9:00 AM  
**To:** Lewis, Bryant J <[Bryant.J.Lewis@maine.gov](mailto:Bryant.J.Lewis@maine.gov)>; Wahle, Benjamin <[Benjamin.Wahle@maine.gov](mailto:Benjamin.Wahle@maine.gov)>  
**Subject:** RE: simple summary of Fecal concentrations for open vs seasonal vs restricted vs prohibited?

**EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Thanks so much for this. We are using it because some communities will be sampling outfalls that are discharging into marine environments for fecal coliform as a screening tool when looking for illicit discharges. The MS4 General Permit requires that the communities regulated for their stormwater discharges do sampling whenever an outfall is flowing after three days of dry weather. We are telling them to notify DMR of the results, and wanted to have some guidelines for when they should be concerned. I know that your scores are very conservative because they are all about the FDA and ingestion of shellfish.

I have attached a QAPP that we are using and you will see the table in the back has a "threshold" for additional investigation if the town is monitoring for fecal coliform. Please note that the samples they are collecting are discharges from outfalls into the water body – not from the water body.

Would you investigate further if the thresholds for 90<sup>th</sup> percentile for open areas were exceeded? Or would you use 2x that? Or some other number.

Hopefully you understand my question....

Kristie L. Rabasca, P.E.  
207-415-5830 (cell)

**From:** Lewis, Bryant J <[Bryant.J.Lewis@maine.gov](mailto:Bryant.J.Lewis@maine.gov)>  
**Sent:** Monday, October 28, 2019 10:16 AM  
**To:** Wahle, Benjamin <[Benjamin.Wahle@maine.gov](mailto:Benjamin.Wahle@maine.gov)>; Kristie Rabasca <[krabasca@integratedenv.com](mailto:krabasca@integratedenv.com)>  
**Subject:** RE: simple summary of Fecal concentrations for open vs seasonal vs restricted vs prohibited?



Kristie,

This webpage explains the classifications.

<https://www.maine.gov/dmr/shellfish-sanitation-management/programs/growingareas/howclassified.html>

The NSSP Model Ordinance dictates how we calculate water quality scores. A 90<sup>th</sup> percentile based on the most recent 30 samples providing a score of 31 or less is Approved, 32-163 is Restricted and above 163 is Prohibited. There is a link to the Model Ordinance on our website, if needed. It describes how to calculate scores for systematic random sampling using membrane filtration.

<https://www.maine.gov/dmr/shellfish-sanitation-management/programs/growingareas/index.html>

I have also attached a document summarizing what is in the Model Ordinance for calculating water quality station scores.

Bryant Lewis  
ME Department of Marine Resources  
Growing Area West Program Supervisor  
194 McKown Point Road  
West Boothbay Harbor, ME 04575  
Tel: 207-633-9401  
Cell: 207-215-4107

**From:** Wahle, Benjamin

**Sent:** Monday, October 28, 2019 9:28 AM

**To:** Kristie Rabasca <[krabasca@integratedenv.com](mailto:krabasca@integratedenv.com)>

**Cc:** Lewis, Bryant J <[Bryant.J.Lewis@maine.gov](mailto:Bryant.J.Lewis@maine.gov)>

**Subject:** RE: simple summary of Fecal concentrations for open vs seasonal vs restricted vs prohibited?

Hi Kristie,

I'm actually going to refer you to Bryant Lewis, who is the Western Region Growing Area Supervisor. He'll be better able to explain DMR's classification system.

-Ben

**From:** Kristie Rabasca <[krabasca@integratedenv.com](mailto:krabasca@integratedenv.com)>

**Sent:** Monday, October 28, 2019 8:03 AM

**To:** Wahle, Benjamin <[Benjamin.Wahle@maine.gov](mailto:Benjamin.Wahle@maine.gov)>

**Subject:** simple summary of Fecal concentrations for open vs seasonal vs restricted vs prohibited?

**EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Good Morning Ben,

I worked with you in Eliot and Cape – and am looking on your website for a simple summary of the P90 concentrations that trigger the various restrictions on shellfishing.

Does such an animal exist? If so, could you share it?

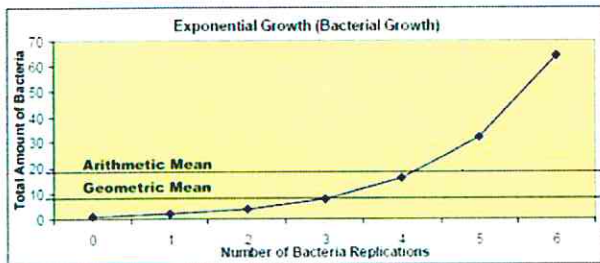
I am working on a QAPP for the stormwater folks and want to provide them with a reference that is accurate and truthed by DMR for when they are sampling outfalls near shellfishing areas.

Thanks for any help you can provide.

DMR uses a membrane filtration (MF) method for fecal coliform analysis using mTEC agar with a two-hour resuscitation step. The geometric mean and the 90<sup>th</sup> percentile are calculated on a minimum of the most recent 30 data points.

### Geometric Mean (Geomean):

The geometric mean, or geomean, is a type of averaging calculation. Unlike a simple average or arithmetic mean, the geomean takes into account the way bacteria grow. During bacterial growth, each bacterium doubles and reproduces itself i.e. one bacterium becomes two, two bacteria become four, four become eight and so on. There are low values at first and the rate of growth increases as the number of colonies increases. This is called exponential growth (Figure 1). This growth pattern means a fecal coliform dataset may have a few high scores and many low scores. The calculation for the geometric mean takes exponential growth into account by transforming the data into logarithms, taking the mean and then converting the number back to a log base 10 number. For example, the arithmetic mean of a fecal coliform score of 300, 150, 23 and 2 CFU/100ml is 119 CFU/100ml. Calculating the geomean, the result is 38 CFU/100ml.



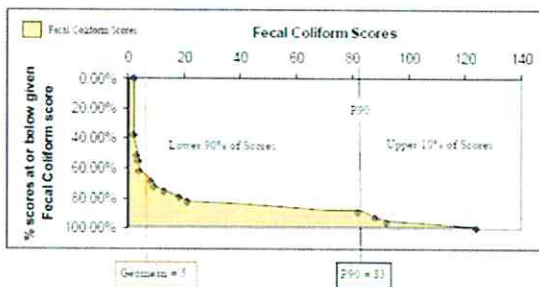
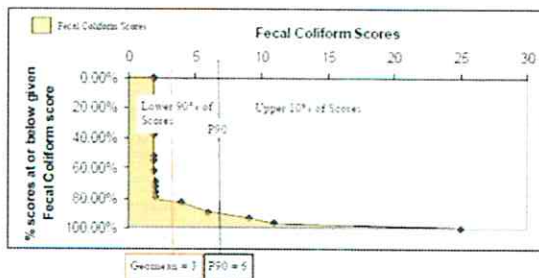
**Figure 1.** The graph illustrates exponential growth. The arithmetic mean for the scores is 18.1 while the geomean is 8.

### 90th Percentile (P90)

The other calculation used for shellfish growing area classification is the 90th percentile (P90). The P90 is the variability standard, meaning this value takes into account the variability of test readings. In any test measurement, successive readings of the same sample would produce slightly different scores each time due to precision of the equipment, human error, etc. This type of variability is a factor of the test method and equipment used and is true of all testing methods.

To account for the variability in the fecal coliform test, a standard has been established. Here again, since bacteria grows exponentially, the calculations are performed on a logarithmic scale. The P90 is based on the distribution of fecal coliform scores and means that 90% of scores are at are below the P90 and 10% scores are above (Figures 2a and 2b). As long as most of the other scores are low, a few high scores will not have a large impact on the P90 value. The P90 standard is the acknowledgment by the NSSP that a few high scores in data set may be due to the variability of the test method. If the area shows high fecal coliform scores intermittently due to pollution events such as rainfall, this may cause water quality to exceed the P90 standards because the shellfish are intermittently subject to polluted waters. For classification determinations, P90s are rounded to the nearest whole number. 0.1-0.49 are rounded down and 0.5-0.9 are rounded up to the next whole number.





**Figures 2a and b.** The lower 90% of the scores fall to the left of the P90 line and 10% of the scores fall to the right. 2a has a low P90 because there are many low scores and a few high scores. 2b has a larger number of high fecal coliform scores, so the P90 is shifted to the right. Although the geomean of 2b passes the approved standard, the area would not be classified as approved because the P90 score is above the threshold.

### Fecal Coliform Standards by Shellfish Growing Area Classification Category

Shellfish Growing Area Classification	Activity Allowed	Geometric mean FC/100ml	90 <sup>th</sup> Percentile (P90) FC/100ml
Approved	Harvesting allowed	≤ 14	≤ 31
Conditionally Approved	Harvesting allowed except during specified conditions	≤ 14 in open status	≤ 31 in open status
Restricted	Depuration harvesting or relay only	≤ 88 and >15	≤ 163 and >31
Conditionally Restricted	Depuration harvesting or relay allowed except during specified conditions	≤ 88 in open status	≤ 163 in open status
Prohibited	Aquaculture seed production only	>88	>163

## Kristie Rabasca

---

**From:** Hudson, Michael S <Michael.S.Hudson@maine.gov>  
**Sent:** Monday, October 7, 2019 11:51 AM  
**To:** Kristie Rabasca  
**Cc:** Plummer, Cherrie F; Poirier, Rhonda  
**Subject:** FW: Proper handling and disposal of CheMetrics Surfactant field test kit residuals  
**Attachments:** surfactants\_CHEMetrics\_k9400instructs.pdf; surfactants\_CHEMetrics\_k9400\_SDSs.pdf; EIASOP-SWTestKits\_REV1.pdf

**Importance:** High

In response to the questions posed regarding proper handling and disposal of CheMetrics Surfactant field test kit residuals:

1. Can the Towns mix the liquids from a. and b. in a single container for disposal as D001 and D022 waste? Or do they need to keep them separate to dispose of them?  
Answer: Chloroform is miscible in alcohols such as n-propanol and is compatible. The Hazardous Waste Management Rules, 06-096 C.M.R. ch. 850 through 858, do not prohibit the mixing of compatible wastes. If mixed, the waste mixture should be coded as both D001 and D022. The town/generator could check with the licensed hazardous waste transporter it intends to use for the hazardous waste pick-up and disposal to determine if it is advisable or more cost effective to keep the wastes separate.
2. The n-propanol waste is super tough to get out of the vial – we pretty much just dispose of the whole vial. Is that okay? Or can we break the vial? And dispose of the empty glass as solid waste (as long as it is RCRA empty).  
Answer: The whole vials containing n-propanol can be disposed of as hazardous waste. If the generator chooses to break the vial to dispose of the n-propanol as hazardous waste and the glass as a solid waste, then the generator must ensure the broken vials are RCRA-empty. Again, the town/generator could check with the licensed hazardous waste transporter it intends to use for the hazardous waste pick-up and disposal to determine if it is advisable or more cost effective to break and empty the vials to dispose of the glass and n-propanol separately. Of course, care and safety measures should be employed if breaking and handling glass vials.
3. Most of these towns are going to be SQGs (Maine Definition), and are going to be generating this waste while they are out in the field over a period of months. Then after each event, they are going to drive it back to the public works facility and set up a SQG haz waste storage area until they can get rid of it (either at HHWD collection, or have a specific pick up). They have 1 year to dispose of it. Have I missed any exemptions or special conditions for this? Is it okay that they are driving it around? Or should they be bringing the water samples back to public works and running the surfactant analysis on it at public works so they don't have to transport it. (its easier for them to run the sample right there while they are at the site).  
Answer: It is preferable for the town/generator to bring samples back from field sites to its Public Works to do the test so that hazardous waste generated by the tests does not have to be transported from field sites. Under the rules, the town/generator would need hazardous waste licenses to transport or accept the hazardous wastes from off-site. Towns should set up a hazardous waste collection container for the hazardous wastes from the tests, with an appropriate size container, labeled as "Hazardous Waste" with an accumulation start date. If the town's Public Works is a Small Quantity Generator (SQG), i.e. it generates for all its hazardous wastes in aggregate no more than 27 gallons/month and accumulates no more than 55 gallon of all of its hazardous waste in aggregate, then the town/generator could accumulate the waste indefinitely until the container of hazardous waste from tests is full at which point the town/generator would have 180 days to ship



via licensed hazardous waste transporter. Town/ Public Works should not dispose of these waste through the Household HW collection programs because they are not household exempt wastes.

4. We are going to do a training of the use of this kit on 10/17 in Portland. I would really like for attendees to be able to practice use of the kit at that training. Do I need to schedule with NRCC or Clean Harbors to come pick up the waste that day (as a licensed transporter), or could one of the communities transport it back to their public works facility for storage until later disposal (during HHWD)?

Answer: Under the rules, the generator should arrange for waste pick-up at the site of generation. These hazardous wastes are not exempt under the household waste exclusion and are not acceptable at Household Hazardous Waste collections events.

The guidance above is based on the information provided below and the applicable rules, Hazardous Waste Management Rules, 06-096 C.M.R. ch. 850 through 858, without information on the number of test kits expected to be used, frequency of testing and volumes of anticipated waste accumulation. If you have questions or would like to discuss the specifics, please feel free to contact me at [Michael.s.hudson@maine.gov](mailto:Michael.s.hudson@maine.gov) or 207-287-7884, or Cherrie Plummer of the Hazardous Waste Management Unit. Cherrie's contact is [Cherrie.F.Plummer@maine.gov](mailto:Cherrie.F.Plummer@maine.gov) and 207-287-7882.

Michael S. Hudson, Supervisor, Hazardous Waste Management Unit  
Maine Department of Environmental Protection  
17 State House Station, Augusta, ME 04333-0017  
Tel. 207-287-7884  
[www.maine.gov/dep](http://www.maine.gov/dep)

---

**From:** Poirier, Rhonda  
**Sent:** Monday, October 07, 2019 9:37 AM  
**To:** Hudson, Michael S <[Michael.S.Hudson@maine.gov](mailto:Michael.S.Hudson@maine.gov)>  
**Subject:** Proper handling and disposal of CheMetrics Surfactant field test kit residuals  
**Importance:** High

Hi Mike,

The sampling she's describing is required by one of the permits in my stormwater program. She is giving a workshop on it on 10/17 and would like to talk to the proper DEP person before that, for planning purposes. Can you help her?

Thank you,  
Rhonda

---

Rhonda Poirier  
MEPDES Stormwater Program Manager  
Bureau of Water Quality  
Maine Department of Environmental Protection  
207-592-6233  
[www.maine.gov/dep](http://www.maine.gov/dep)

---

**From:** Kristie Rabasca <[krabasca@integratedenv.com](mailto:krabasca@integratedenv.com)>  
**Sent:** Tuesday, October 01, 2019 4:02 PM  
**To:** Poirier, Rhonda <[Rhonda.Poirier@maine.gov](mailto:Rhonda.Poirier@maine.gov)>  
**Cc:** Aimee Mountain ([Aimee.Mountain@gza.com](mailto:Aimee.Mountain@gza.com)) <[Aimee.Mountain@gza.com](mailto:Aimee.Mountain@gza.com)>; Damon Yakovleff <[dyakovleff@cumberlandswcd.org](mailto:dyakovleff@cumberlandswcd.org)>  
**Subject:** Proper handling and disposal of CheMetrics Surfactant field test kit residuals

Hi Rhonda,

Thanks for taking my call.

I am developing a dry weather monitoring training session for the ISWG and SMSWG MS4s, and am developing a QAPP and some checklists.

We will need to use the CheMetrics K-9400 field test kit for surfactants. I have attached the instructions for the kit, and the Safety Data Sheets for the two reagents. Generally for each sample we will do the following:

1. Add 5 ml of water to a small plastic vial
2. Add 4ml of the double tipped reagent (SDS attached and it is flammable and contains 71% chloroform)
3. Shake
4. Use the 0.25 ml sealed glass ampule ( which is 98% N-propanol) to draw the organic phase out of the plastic vial with the water and the first reagent.
5. Use colorimeter to check detergent concentration of sample.

So the two wastes we have when done are:

- a. The mixture of the 5 ml water and the 4 ml 71% chloroform (which is still flammable) in the plastic vial (minus about 1 ml extracted into the n-propanol vial)
- b. About 1 ml of the n-propanol and the chloroform organic phase in a very small glass ampule.

I am requesting the EPA SOP on this – but I do not think it has the detail I want.

When I have used this in the past, I have given it to the municipality where it was generated and told them it was a Doo1 Flammable and D022 Tox-chloroform waste, and they hand it to clean harbors during household hazardous waste day.

We are going to have a lot more people generating this waste – using these kits, and we need to handle it properly. As we provide them with guidance, we want to make sure it is right.

My questions are:

1. Can the Towns mix the liquids from a. and b. in a single container for disposal as Doo1 and Do22 waste? Or do they need to keep them separate to dispose of them?
2. The n-propanol waste is super tough to get out of the vial – we pretty much just dispose of the whole vial. Is that okay? Or can we break the vial? And dispose of the empty glass as solid waste (as long as it is RCRA empty)
3. Most of these towns are going to be SQGs (Maine Definition), and are going to be generating this waste while they are out in the field over a period of months. Then after each event, they are going to drive it back to the public works facility and set up a SQG haz waste storage area until they can get rid of it (either at HHWD collection, or have a specific pick up). They have 1 year to dispose of it. Have I missed any exemptions or special conditions for this? Is it okay that they are driving it around? Or should they be bringing the water samples back to public works and running the surfactant analysis on it at public works so they don't have to transport it. (its easier for them to run the sample right there while they are at the site).
4. We are going to do a training of the use of this kit on 10/17 in Portland. I would really like for attendees to be able to practice use of the kit at that training. Do I need to schedule with NRCC or Clean Harbors to come pick up the waste that day (as a licensed transporter), or could one of the communities transport it back to their public works facility for storage until later disposal (during HHWD)?

So many questions.... Perhaps I could talk with someone at Haz waste.... Thanks for any help you can provide.



Kristie L. Rabasca, P.E  
Integrated Environmental Engineering, Inc.  
12 Farms Edge Road  
Cape Elizabeth, ME 04170  
207-415-5830

**Addendum 3**  
**Example Chains of Custody**



# Laboratory Sample Chain of Custody

Client:		Contact:		Phone #:		Email														
Address:		City:		State:		Zip Code:														
Purchase Order #:		Proj. Name/No.:		Quote #:																
Bill (if different than above):				Address:																
Sampler (Print/Sign):					Copies To:															
<b>LAB USE ONLY</b>		Work Order #:			Analysis and Container Type															
Remarks:  Shipping Info:      FEDEX      UPS      CLIENT Airbill No: Temp C                      Temp Blank                      Intact      Not Intact					Preservatives															
					Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N						
*	Sample Description	Date/Time Collected	Matrix water/soil /other	No. of Containers																
COMMENTS:																				
Relinquished By:				Date/Time		Received By:				Relinquished By:				Date/Time		Received By:				
Relinquished By:				Date/Time		Received By:				Relinquished By:				Date/Time		Received By:				



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Street:		Third Party Billing requires written authorization from third party					
City:	State/Province:	Zip/Postal Code:	Country:				
Report To (Name):		Fax #:					
Telephone #:		E-mail Address:					
Project Name/ Number:							
Please Provide Results: <input type="checkbox"/> Fax <input type="checkbox"/> E-mail		PO#	State Samples Taken:				
Turnaround Time (TAT) Options* - Please Check							
<input type="checkbox"/> 3 Hour	<input type="checkbox"/> 6 Hour	<input type="checkbox"/> 24 Hour	<input type="checkbox"/> 48 Hour	<input type="checkbox"/> 72 Hour	<input type="checkbox"/> 96 Hour	<input type="checkbox"/> 1 Week	<input type="checkbox"/> 2 Week
*Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements.							
<b>Fungi</b>		<b>Bacteria</b>		<b>Insects</b>			
<input type="checkbox"/> ERMI Panel (M180) Dust Only		<input type="checkbox"/> Human <i>Bacteroides</i> (M199)		<input type="checkbox"/> Bed Bug ( <i>Cimex lectularius</i> ) (M146)			
<input type="checkbox"/> EPA 36 Panel (M233) Air, Swab		<input type="checkbox"/> Total <i>Bacteroides</i> (M095)		<input type="checkbox"/> Tick - <i>Anaplasma phagocytophilum</i> Anaplasmosis (M261)			
<input type="checkbox"/> Water Damage 20 Panel (M181)		<input type="checkbox"/> <i>E. coli</i> O157:H7 (M140)		<input type="checkbox"/> Tick - <i>Babesia microti</i> Babesiosis (M260)			
<input type="checkbox"/> Wood Rot Fungi 10 Panel (M232)		<input type="checkbox"/> <i>E. coli</i> (M200)		<input type="checkbox"/> Tick - <i>Borrelia burgdorferi</i> Lyme disease (M196)			
<input type="checkbox"/> <i>Aspergillus</i> 15 Panel (M186)		<input type="checkbox"/> Total <i>Enterococcus</i> (M096)		<b>Other</b>			
<input type="checkbox"/> <i>Aspergillus</i> 6 Panel (M188)		<input type="checkbox"/> <i>Helicobacter pylori</i> (M207)		<input type="checkbox"/> <i>Acanthamoeba</i> spp. (M147)			
<input type="checkbox"/> <i>Penicillium</i> 13 Panel (M189)		<input type="checkbox"/> <i>Legionella pneumophila</i> (M103)		<input type="checkbox"/> <i>Cryptosporidium</i> spp. (M237)			
<input type="checkbox"/> Customized Fungi Panel (M100)		<input type="checkbox"/> <i>Legionella</i> 4 species-EPA (M162)		<input type="checkbox"/> <i>Giardia</i> spp. (M149)			
<input type="checkbox"/> <i>Penicillium</i> Mycotoxin 9 Panel (M190)		<input type="checkbox"/> <i>Legionella</i> Broad Screen (M163)		<input type="checkbox"/> Enterovirus RT-PCR (M142)			
<b>Birds, Animal Droppings</b>		<input type="checkbox"/> MRSA (M203)		<input type="checkbox"/> Food Authentication (F130)			
<input type="checkbox"/> <i>Chlamydomytila psittaci</i> (M234)		<input type="checkbox"/> <i>Mycobacterium avium</i> (M144)		<input type="checkbox"/> GMO Analysis (F131)			
<input type="checkbox"/> <i>Cryptococcus neoformans</i> (M143)		<input type="checkbox"/> <i>Mycobacterium tuberculosis</i> (M159)		<input type="checkbox"/> DNA Barcode Analysis (M195)			
<input type="checkbox"/> <i>Histoplasma capsulatum</i> (M208)		<input type="checkbox"/> <i>Pseudomonas aeruginosa</i>		<input type="checkbox"/> DNA Sequencing Fungi/Bacteria Isolates (M192)			
<input type="checkbox"/> Raccoon Roundworm (M236)		<input type="checkbox"/> <i>Salmonella</i> spp. (M141)		<input type="checkbox"/> Special Request:			
<input type="checkbox"/> Rodent (Mouse, Rat) Dropping (M271)		<input type="checkbox"/> <i>Shigella</i> spp. (F122)					
Sample #	Sample Location	Sample Type	Test Code	Volume/Area	Date/Time Collected		
Client Sample # (s): -				Total # of Samples:			
Relinquished (Client):				Date:	Time:		
Received (Lab):				Date:	Time:		
Comments:							

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information



EMSL ANALYTICAL, INC.  
LABORATORY • PRODUCTS • TRAINING

**EMSL Order Number** *(Lab Use Only):*

EMSL ANALYTICAL, INC.  
200 ROUTE 130 NORTH  
CINNAMINSON, NJ 08077  
PHONE: (800) 220-3675  
FAX: (856) 786-0262

Sample #	Sample Location	Sample Type	Test Code	Volume/Area	Date/Time Collected

**\*\*Comments/Special Instructions**

**Addendum 4**  
**User Manual(s) and Safety Data Sheets (SDS) for**  
**Field Equipment and/or Test Kit(s)**  
**(This is an optional addendum. The information**  
**must be located where field personnel can access**  
**electronically or in paper form, so this**  
**Addendum can be used as a place to describe**  
**where field personnel will find equipment,**  
**manuals and SDSs).**